US009470520B2

(12) **United States Patent**
Schwarz et al.

(10) **Patent No.: US 9,470,520 B2**
(45) **Date of Patent: Oct. 18, 2016**

(54) **LIDAR SCANNER**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 136 days.

(21) Appl. No.: **13/826,155**

(22) Filed: **Mar. 14, 2013**

(65) **Prior Publication Data**

US 2014/0268098 A1 Sep. 18, 2014

(51) **Int. Cl.**

G01C 3/08	(2006.01)
G01S 17/10	(2006.01)
G01S 7/481	(2006.01)
G01S 7/486	(2006.01)
G01S 7/487	(2006.01)
G01S 7/497	(2006.01)

(52) **U.S. Cl.**

CPC ***G01C 3/08*** (2013.01); ***G01S 7/4818*** (2013.01); ***G01S 7/4865*** (2013.01); ***G01S 7/4873*** (2013.01); ***G01S 17/10*** (2013.01); *G01S 2007/4975* (2013.01)

(58) **Field of Classification Search**

CPC G01S 2007/4975; G01C 3/08

See application file for complete search history.

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(57) **ABSTRACT**

A LiDAR sensor can include a laser, a directional sensor, a window, an electromagnetic pulse receiving sensor, and a processor. The laser can be configured to emit a narrow electromagnetic pulse. Further, the directional sensor can be configured to measure the direction of the narrow electromagnetic pulse emitted by the laser. The narrow emitted electromagnetic pulse can pass through the window. The pulse can then be reflected by at least the window and an object external from the LiDAR sensor, creating at least two reflected pulses. The electromagnetic pulse receiving sensor can be configured to measure the two reflected pulses resulting from the narrow pulse emitted by the laser. The processor can be configured to receive information from the sensors, indicating a position of the object relative to the LiDAR sensor. Further, the processor can be configured to measure the intensity of the pulse being reflected by the window.

18 Claims, 8 Drawing Sheets